ARB's Heavy-Duty Diesel Vehicle Inspection





Presented to the: SMAQMD

By/:

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California Environmental Protection



WeivrevO

- ARB's Heavy-Duty Vehicle Smoke Inspection Programs (Roadside Inspections, Fleet Inspections)
- Related Topics/Issues

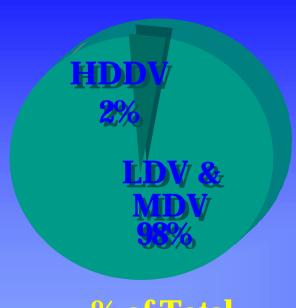


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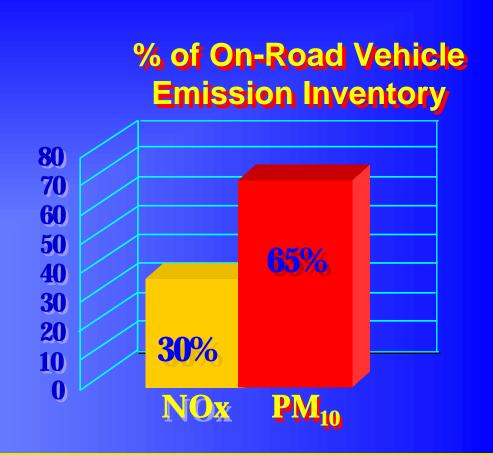
Heavy-Duty Vehicle Smoke Inspection Program

- The Problem
- History of the Program, 1988 1996
- History of the Program, 1997 present

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% of Total
On-Road Vehicles



Clear Day



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Air Resources Bo

Smoggy Day



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Health and Environmental Impacts

Constituent	Detrimental Effect
Particulates (PM ₁₀ /PM _{2.5})	Carcinogenic/Mutagenic Respiratory Disease
HC & NOx (Smog Precursors)	Ozone (smog) Respiratory Disease Crop Losses
Nox & Sox	Acid Deposition Visibility Degradation
Toxic Air Contaminants	Carcinogenic



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Types of Smoke

Black smoke is caused by incomplete combustion (wasted fuel)



Blue smoke is caused by unburned engine oil mixed in the exhaust



White smoke is caused by drops of unburned liquid fuel and water vapor



Source: ATA, EMA "On the Road to Clean Air"

Mechanical Causes of Excessive Smoke

- Restricted air filter
- Improper injection timing
- Clogged, worn or mismatched fuel injectors
- Faulty fuel injection pump
- Defective or maladjusted puff limiter
- Low air box pressure

- Improperly adjusted governor
- Air manifold leaks
- Malfunctioning turbocharger
- **Malfunctioning aftercoolers**
- Maladjusted fuel rack
- **Defective air fuel controller**
- **Poor fuel quality**
- Improper driving gear







Initial Roadside Inspections

- Roadside smoke inspections required by legislation in 1988 (SB 1997, Presley)
- Initial regulations adopted 1990
 - Intrastate/interstate/ international vehicles
 - Inspections performed at roadside locations
 - Used SAE J1243 test protocol
 - Smoke opacity limits:
 - 1991+ engines: 40%
 - pre-1991 engines: 55%
- Program enforced from 1991 to 1993



Initial Fleet Inspections



- Fleet inspections required by legislation in 1990 (SB 2330, Killea)
- California fleets of two or more vehicles
- First regulations adopted in 1992; voluntary enforcement
- Annual self-inspection
- ARB audits

Initial Roadside Inspections - Litigation

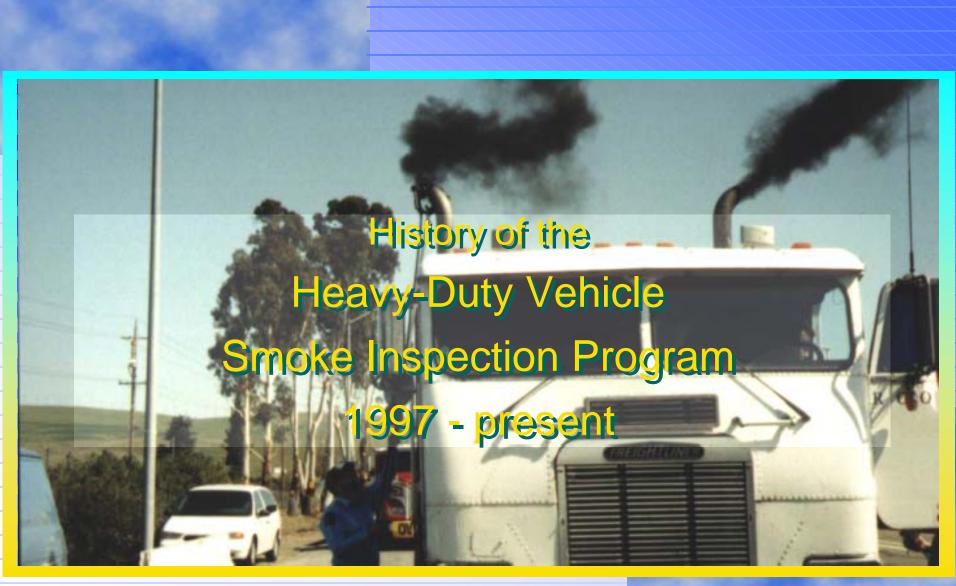
- Valley Spreader et al. v. ARB
 Imperial County Superior Court
 1993 decision for ARB
 Upheld the program and test procedures
- Harris Transportation et al. v. ARB
 Sacramento County Superior Court
 1994 decision for ARB
 Upheld the program and test
 procedures
 Upheld by 3rd District Court of
 Appeals (Sacramento);
 California Supreme Court denied
 review
- Aura Hardwood et al. v. ARB
 Sacramento County Superior Court
 1994 decision for ARB
 Upheld the program and test
 procedures
 Upheld by 3rd District Court of
 Appeals (Sacramento);
 California Supreme Court denied
 review
- Viviano et al. v. ARB
 Sacramento County Superior Court
 1997 decision for ARB
 Upheld the program and test
 procedures Upheld by 3rd District
 Court of Appeals (Sacramento);
 California Supreme Court denied
 review

SAE J1567

- Committee established in 1992
- Diverse membership: (ARB, US E.P.A., EMA, ATA, CTA, smokemeter manufacturers, other states, academia)
- Test protocol and smokemeter specifications
- Adopted by SAE in February 1996

Statutory Requirements (AB 534, Cortese) 1993

- Consistent and repeatable tests
- No false failures (unless remedied without cost to owner)
- Adoption of SAE J1667 satisfies requirements



Updated Roadside Inspections

- Updated regulations adopted by ARB in December 1997
- Opacity cutpoints retained
 - 1991+ engines: 40%
 - pre-1991 engines: 55%
- Use of SAE J1667 test protocol
- Administrative appeals through Administrative Law Judge (ALJ) hearing process
- Enforcement resumed June 1, 1998



Penalty Schedule

Violation	Correction	Penalty
Notice of Violation	Repaired within 45 days	\$0
First citation	Repaired within 45 days	\$300
First citation	Not repaired within 45 days	\$800 (\$300 + \$500)
More than one citation in a year	Repaired within 45 days	\$1,800 (\$300 + \$1,500)

Updated Periodic Fleet Inspections



- Revised regulations adopted December 1997
 - Same cut points as roadside program
 - Uses SAE J1667 test protocol
 - Four-year rolling exemption
- Commenced July 1, 1998
- 15-month phase-in

Statewide Benefits

(was per day)

	ROG	NOx	PM ₁₀
1999	6.4	12.2	5.2
2010	5.3	14.0	3.2

(EMFAC 7g)

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Annual Costs (Combined Roadside and Fleet Programs)

	<u>.1ຄ</u>	<u> 2010</u>
Administrative Costs to Fleets	\$17 million	\$22 million
Costs to Vehicle Owners	\$24 million	\$20 million
Fuel Costs (Savings)	-\$22 million	-\$25 million
Total Net Costs of Both Programs	\$19 million	\$17 million
Both Programs Note - Gallons of fuel saved: in 1		

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Cost Effectiveness

1999 2010

\$1.12/pound*

\$1.05/pound*

*(ROG, NOx, PM-10)

Roadside Inspections Statistics

	Initial Program (1991 - 1993)	Current Program (June 1993 - Dec 2003)
No. Visual Inspections	38,947	101,391
Number of Citations Number of NOVs Total Violations	8,492 N/A 8,492	4,863 1,750 6,613
Failure Rate Number Appealed	22% 1,157 (14%)	6.5% 111 (1.7%)
Penalties Assessed Penalties Collected	\$2,613,300 \$2,061,500 (79%)	\$ 1,547,400 \$ 1,235,800(80%)

Delinquent Citation Collection Status

(Data lineugh 12/31/83)

	Pending	Cleared	Collected
HDVIP I	694	677	\$175 K
HDVIP II	733	534	\$178 K
TOTAL	1427	1211	\$353 K



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Periodic Fleet Inspections Statistics

- 14,000+ fleets in state
- 56,000+ terminals in state (CHP 2000 BIT database)
- ARB audits these fleets/terminals for compliance
- Phase-in period ended October 1, 1999
- Activity to date (through 12/31/03):
 - ~8,500 fleets audited
 - Compliance rates <u>at initial audit</u>:
 - 42% show full compliance
 - 28% partial compliance (~99% compliance on follow-up)
 - 30% non-compliance (~99% compliance on follow-up)
 - 3 enforcement cases completed to date (~\$100K in penalties)

Outreach Activities

- Compliance assistance to fleets
- Presentations to associations
- Technical papers/presentations
- Mailouts
- Pamphlets/fact sheets
- Information on ARB web site@ www.arb.ca.gov/enf/enf.htm
- ARB released updated video in fall 2000—on ARB web site



California Council on Diesel Education and Technology



- Partnership: Community colleges, government, industry
- Low-cost training of smoke-test protocol and smoke-related engine repairs
- ARB audits classes for QA/QC
- Participating Schools:
 College of Alameda (Oakland area)
 San Joaquin Delta College (Stockton)
 L.A. Trade Tech College (Los Angeles)
 Palomar College (San Diego County)
 Santa Ana College (Orange County)
 San Diego Miramar College

Related Topics

- National HDD
 I/M Guidance
 (USEPA/SAE/ARB)
- On the Road to Clean Air
- Enforcement at the Mexican Border/ NAFTA
- Dyed Diesel
 Inspections(BOE/IRS)

- Use of Penalty Funds(VIRF/DERF)
- Smoking Vehicle Complaint Line
- M-17 Heavy-Duty Diesel Vehicle I/M
- School Bus Idling ATCM
- HDDE Reflash

Heavy-Duty Diesel | MI Guidance

- Adopted February 1999 by the U.S. EPA as a "Guidance"
- ARB program serves as model
- Recommends nationwide use of SAE J1667 test protocol
- Recommends cutpoints (adjusted for altitude):
 - 40% for 1991+
 - 55% for pre-1991
- Other states/provinces with smoke programs:
 Arizona, Colorado, Connecticut, Maryland, Nevada, New Jersey,
 New York, Ohio, Utah, Washington, British Columbia and Ontario (Canada), Jalisco (Mexico), and others

On the Road to Clean Air



- Campaign co-sponsored by:
 - American Trucking Association
 - Engine Manufacturers' Association
 - Supported by ARB
- Video, pamphlet, public service announcements and press releases -Spring 1997
- Strong antitampering message

Enforcement at the Mexican Border & NAFTA

- Legislation (SB 270, Peace) in 1998 authorized:
 - Full time enforcement at Otay Mesa and Calexico Border Crossings
 - Funding for inspection site improvements at Otay Mesa and Calexico
- ~3,000 commercial trucks cross into California at these crossings each day
- NAFTA Issues & Current Litigation (U.S. Supreme Court)



Dyed Diesel Inspections

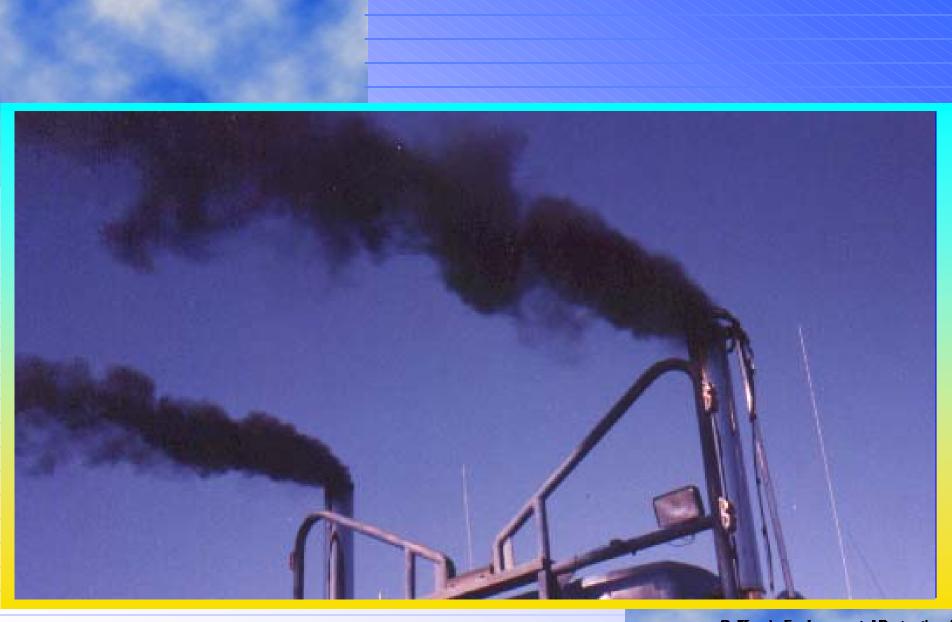
- Dyed diesel (RED) is a taxfree fuel intended for use in public fleets and non-road (agriculture and construction) vehicles
- ARB performs inspections for Board of Equalization/Internal Revenue Service
 - Concurrent with roadside inspections
 - Approximately 25,000 inspections per year



Use of Penalty Funds

Diesel Emissions Reduction Fund

- \$300 portion of citation
- Funds research for clean diesel technology
- Provided ~\$3.48 million, to date, towards research and development
- Current program to support Advanced Technology Program and Carl Moyer Program low-NOx technology incentives
- Vehicle Inspection and Repair Fund
 - Funds from the portion of a citation that is greater than \$300
 - Funds support Smog Check Program



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Smoking Vehicle Complaint Line

- Toll-free number and toll-free cellular telephone number available for motorists to report smoking vehicles:
 - 1-800-END-SMOG or #SMOG on cellular telephone
- ARB sends vehicle owner an advisory letter alerting them that their vehicle is emitting excessive smoke and asking them to repair it and return proof of correction
- ARB receives approximately 2,500 calls each year and sends out approximately 2,000 letters each year
- Approximately 45% of owners repair their vehicles



MI-17 Heavy-Duty I/M

- Board adopted M-17 SIP Amendment in February 1997
- Heavy-Duty Diesel Engine test cycles under development
- Heavy Duty Diesel Engine in use compliance and recall program under development

School Bus Idling ATCM

- Regulation adopted in December 2002 as an ATCM
- Prohibits HDD school buses and delivery vehicles from idling
- Enforced by ARB/APCDs/CHP/Local Law Enforcement
- Public may report violations to ARB @ www.arb.ca.gov/enf/enf.htm or 1-800-END SMOG
- General On-Road HDDV idling ATCM under development

HDDE Reflash

- Result of Consent Decrees between U.S. EPA,ARB and Engine Manufacturers
- ~41 TPD NOx reduced or 25% per HDDE reflashed
- March 2004 Board Hearing for regulation adoption
- Enforced by ARB unless voluntary program adopted

Summary

- On-road heavy-duty diesel vehicles produce a disproportionate amount of California's NOx and Particulates
- ARB administers two-part program to reduce smoke emissions from these vehicles
- Program is cost-effective and achieves significant emissions reductions
- Program has become model for national and international programs